

### **What is claimed is:**

**[Claim 1]** 1. A boost circuit capable of boosting a reference voltage into an output voltage, the boost circuit comprising:

a main transistor electrically connected to the output voltage;  
an auxiliary transistor electrically connected to the output voltage;  
a pre-charge circuit electrically connected to the main transistor and the auxiliary transistor for pre-charging the main transistor and the auxiliary transistor; and  
a voltage detector electrically connected to the auxiliary transistor and the reference voltage for controlling the auxiliary transistor according to the reference voltage.

**[Claim 2]** 2. The boost circuit of claim 1, wherein the main transistor is a triple-welled NMOS.

**[Claim 3]** 3. The boost circuit of claim 1, wherein the auxiliary transistor is a triple-welled NMOS.

**[Claim 4]** 4. The boost circuit of claim 1, wherein the voltage detector disables the auxiliary transistor when detecting that the reference voltage is higher than a predetermined voltage.

**[Claim 5]** 5. The boost circuit of claim 1, wherein the pre-charge circuit comprises:

a first PMOS transistor;  
a second PMOS transistor electrically connected between the first PMOS transistor and the main and the auxiliary transistors; and  
a level shift circuit electrically connected to the second PMOS transistor and the output voltage for transferring the output voltage to the second PMOS transistor according to a switch voltage.

**[Claim 6]** 6. The boost circuit of claim 1 further comprising a re-charge module electrically connected to the main transistor for re-charging the main transistor.

**[Claim 7]** 7. The boost circuit of claim 6, wherein the re-charge module comprises:

- a stable transistor;

- a main re-charge transistor electrically connected between the stable transistor and the main transistor for re-charging the main transistor according to a voltage level of the stable transistor; and

- a stable re-charge transistor electrically connected between the stable transistor and the main transistor for re-charging the stable transistor according to a voltage level of the main transistor.

**[Claim 8]** 8. A boost circuit capable of boosting a reference voltage into an output voltage, the boost circuit comprising:

- a main transistor electrically connected to the output voltage;

- a pre-charge circuit electrically connected to the main transistor for pre-charging the main transistor;

- a stable transistor;

- a main re-charge transistor electrically connected between the stable transistor and the main transistor for re-charging the main transistor according to a voltage level of the stable transistor; and

- a stable re-charge transistor electrically connected between the stable transistor and the main transistor for re-charging the stable transistor according to a voltage level of the main transistor.

**[Claim 9]** 9. The boost circuit of claim 8 further comprising:

- an auxiliary transistor electrically connected to the output voltage; and

a voltage detector electrically connected to the reference voltage and the auxiliary transistor for controlling the auxiliary transistor according to the reference voltage.

**[Claim 10]** 10. The boost circuit of claim 9, wherein the voltage detector disables the auxiliary transistor when detecting that the reference voltage is higher than a predetermined voltage.